

METHOD FOR PATTERNING A DUAL DAMASCENE WITH RETROGRADE IMPLANTATION

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ABSTRACT OF THE INVENTION

a substrate is provided, and a dielectric layer is formed, thereon. Then a photoresist layer is formed on the dielectric layer and defined a predetermined region for ion implantation. Next, a dense region of dielectric layer is formed by retrograde implantation with photoresist layer as an ion implanted mask, wherein the dense region is a predetermined region for trench. A hard mask layer is formed on the dielectric layer after the photoresist layer is removed. Afterward forming and defining another photoresist layer on the hard mask layer to expose a partial surface of the hard mask layer as a trench region, wherein the partial surface of the hard mask layer comprises the dense region. Subsequently, an etching process is performed by means of the photoresist layer as the etched mask to etch through the hard mask layer and the dielectric layer until the substrate surface is exposed for patterning the dual damascene.